USE OF INTERNET WEB TECHNOLOGY TO
REGISTER WIRELESS ACCESS CUSTOMERS

This is a continuation-in-part of application Serial No. 09/432,824, filed November 2, 1999, entitled "CELLULAR WIRELESS INTERNET ACCESS SYSTEM USING SPREAD SPECTRUM AND INTERNET PROTOCOL (IP)."

INTRODUCTION

The present invention is directed to the use of Internet web technology to register wireless access customers.

BACKGROUND OF THE INVENTION

The above application describes a cellular wireless Internet access system which operates in the 2 gigahertz or other frequency bands to provide high data rates to fixed and portable wireless Internet devices. Such users connect to near-by base stations which in turn communicate to Integrated Network Controllers which are then connected to the Internet. Such wireless implementation relates to an access network of the UMTS (Universal Mobile Telephone Service) and its subset UTRAN (Universal Terrestrial Radio Access Network) standards.

In order to gain service in a cellular wireless network of the types similar to the above, a sales representative at a retail location typically takes customer information, credit card number and credit history, etc. That information used to create an account with a cellular service provider, with the customer information stored on the service provider's Home

5   Location Register (HLR) or other customer database. A SIM (Subscriber Identity Module) card is then associated with the account and placed within the cellular terminal (typically, a mobile phone or wireless Internet device).

Both of the above techniques are cumbersome, requiring action on the part of the retailer or network service provider, and creating a time delay before a new customer can use the

10   service. It is therefore desired to allow the user to self-register to gain access to Internet services over the wireless system as above.

OBJECT AND SUMMARY OF INVENTION

It is therefore an object of the present invention to provide a method for allowing a new customer in a wireless Internet system to self-register.

15   In accordance with the above object, there is provided a method of operating a cellular wireless Internet access system including registration of wireless Internet access users having a personal computer (PC) or similar device where each user utilizes portable wireless User Equipment (UE) typically with a directly attached antenna for communicating in a wireless manner with a cellular network controller, the method

20   comprising the steps of the user acquiring the User Equipment along with magnetic, storage means (CD) having predetermined software for use in registration. Next, the terminal is connected to the PC and the CD installed in the PC. A wizard in the predetermined software controls the PC and its connected wireless User Equipment.

Under the direction of the wizard in the PC, the User Equipment is commanded to

25   communicate in a wireless manner with the wireless network. Because the customer has

not previously registered with the wireless access network operator, it is only permitted on the network as an anonymous subscriber and is permitted to communicate only with the network operator's registration web server. This is achieved by the use of a special 'new user' ID and password pre-programmed on the CD. A communication session is

5   established between the PC, User Equipment and the network operator's registration web server (via wireless access), and credit card, other personal details and type of service required are entered. The registration web server contains a list of allowable ISPs that can be accessed on the system this list is used for subsequent accesses after registration has completed. The user enters a preferred User ID and if authorized by the registration

10   server, the customer is allocated a User ID and Password; the same information is transferred to PC and the access network operator's Home Location Register (which contains the database of authorized customers). Thereafter, the subscriber is authorized to use the network and can establish normal connections on the wireless network and to allowable ISPs (Internet Service Providers) for an Internet session and access to any part

15   of the Internet permitted by that ISP.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of an Internet system illustrating the present invention.

FIG. 2 is a flow chart showing the operation of the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

20   Referring now to FIG. 1, two users of the Internet access system are illustrated at 21 and 22 with User Equipments, known as User Equipment (UE), connected by a typical data connection to the computer using RS232, USB or Ethernet. The personal computer has a CD drive or similar media input device in which a special compact disk, or similar media, containing software including a wizard (that is, the instructional system procedures for

25   registration) which is placed in the CD drive. Both the UE and CD are acquired and

purchased at some retail location or by mail. In any case, both the CD and the UE are at the location of the user.

The wireless access UE 21 and 22, as described in the above application, are a part of a UMTS/UTRAN system which by many wireless techniques (a specific novel one is

5 described in the above application) communicates in a wireless manner via a UTRAN network as indicated by the symbol 23 to an Integrated Network Controller (INC) 24. Such controller may be connected by wireline or otherwise to an Internet Protocol (IP) Network 31. As discussed in the above pending application, the Integrated Network Controller 24 includes an RNC or Radio Network Controller 26 which controls and

10 allocates the radio network resources and provides reliable delivery of user traffic between a base station (described in the above pending application) and User Equipment (UK) and eventually the Integrated Network Controller (INC) 24. An SGSN (Serving General Packet Radio Service Support Node) 27 provides session control and connection to the Access Operator Radius Authentication Server 34 and, lastly, LAC 28 (layer 2

15 Tunneling Protocol Access Concentrator) provides the gateway functionality to the Internet Service Providers (ISP) 40 and to the registration server. A Layer 2 Tunneling Protocol Network Server (LNS) 30 terminates communication tunnels from the LAC through the IP network. The Access Operator Radius Authentication Server 34 supports the Home Location Register (HLR) functionality (described in the above pending

20 application). The Access Operator Registration Server 36 provides the facilities for a new user to register.

The Integrated Network Controller 24 also illustrates that it incorporates a "RADIUS" client 29. RADIUS is a system including the software that supports centralized access control for Internet access, which, as discussed above, is traditionally used where the

25 access to the Internet is via the public switched telephone network. A description of RADIUS is provided by an article RFC 2138 Remote Authentication Dial-in User Service (RADIUS) by C. Rigney, et al., April 1997.

In all cases of communication of a user equipment 21 or 22 through the Internet Protocol Network, illustrated as 31, authentication is performed by the user equipment (UK) signaling the customer's wireless access authentication information which is passed over the air to Integrated Network Controller 24 which queries a RADIUS server

5   authentication service with the user ID (identification) and temporary password. The RADIUS server used is the Access Operator's RADIUS Authentication Server 34 which communicates with the Integrated Network Controller via the IP network using UDP/IP protocols with additional protocol layers for security.

In the case of a new user, a 'new user' ID and temporary password, preprogrammed in the

10   CD software, is signaled to the Access Operator RADIUS Authentication Server 34 via the INC 24. The Access Operator RADIUS Authentication Server 34 recognizes the user as a 'new user' and communicates a set of protocol filters to the INC 24 that results in a PPP (Point-to-Point Protocol) session being set up between the User's PC and the Access Operator's Registration Server 36 via the Layer 2 Tunneling Protocol communication link

15   32 and bars the user from accessing any other service. The Access Operator's Registration Server 36 is connected to the subscriber account management and billing system 37.

Thus, the foregoing constitutes the anonymous session link where a general or non-authenticated user can still gain access to the wireless access operator's registration

20   server for the purpose of new-user registration. The accompanying legend indicates the various paths. A UMTS access network operator 33 provides the special servers 34 and 36 along with the billing system 37.

The flow charts of FIG. 2 aptly describes the operation shown in the block diagram system of FIG. 1. After Start, in Step 1, the user purchases the equipment, which has been

25   defined as the User Equipment (UK) and a CD with the appropriate software and wizard procedure installed on it. A manual is also provided. The CD also contains, besides the installation software, the required software drivers. The user residence when the user

purchases the foregoing may be checked for coverage via use of the user's zip code or other geographic information. This information can all be provided by Internet web access.

In Step 2, the User Equipment is connected to the PC. This connection can be USB, Ethernet, RS 232, etc., as illustrated in FIG. 1.

In Step 3, the User Equipment is installed on the PC. This is done through the wizard software and will support all the connection interfaces specified; that is, the RS 232, USB or Ethernet. Steps 3a and 3b are precautionary checks. In Step 3a, the UE installation software checks that the modem is connected correctly and operational. If no return is made because of a failed installation process, designated by the A, a cell search is performed in the next Step 3b. Here, the User Equipment received signal quality is measured and reported to the user via the installation wizard. Again, if the quality of the signal fails, a return is made to Start. In effect, registration will not be possible.

In Step 4, the user's PC, using standard "attention" (AT) modem commands, sends new user ID and temporary password to the UE. Then in step 5 the UE sends this authentication information over the air to the RNC 26 which is passed onto the Radius Client 29 and the SGSN 27 which, queries the RADIUS server 34 with the "new user" ID and temporary 'new user' password. In step 6 the RADIUS server 34 responds with acceptance plus a set of protocol filters to be applied in the SGSN 27 to the traffic for this specific registration session. The protocol filters serve to bar this user from accessing other Internet services or sites other than the predetermined registration server 36. The RADIUS server also details the ISP, in this case an ISP at the access network operator, to connect to the UMTS access operator 33 and to the registration web server 36.

Next, in Step 7, the Layer 2 Tunneling Protocol Access Concentrator 28 in the Radio Network Controller 24 sets up, as shown by the dashed line 32 in FIG. 1, a communications tunnel to LNS 30 and waits for a PPP (point-to-point protocol)

connection request to come in. In step 8, the PC "dialer" software then proceeds to initiate a PPP session which is passed to the LNS via layer 2 tunneling protocol for authentication. In step 9, the LNS then terminates the various protocols used within PPP for setting up the connection and validates a dial-up "new user" user ID and password

5   passed over the PPP. This involves a second query to the RADIUS server 34 represented by path 41.

In Step 10, once the dialer is connected to the personal computer, PC, via the PPP, the installation wizard activates the PC's web browser, which will then download a web page for registration from the Registration Web Server 36. Then, in step 11, the user is

10   prompted to enter preferred user ID, password, credit card details, personal details, type of service required. A list of allowable ISPs supported by the Access Operator is provided as well as their specific registration software if required. Information on the types of service available is provided via the registration web page. In step 12, when the user has entered the appropriate data and "clicked to send" the information is sent to the

15   registration server. In step 13 the registration server checks the information entered (including credit card authorization if required) and generates a permanent password. If the requested User ID has already been allocated the user will be provided with an option or requested to enter a new User ID. In step 14 the user is informed of successful registration via a web page downloaded from the Registration Web Server 36 that contains

20   the user's name and permanent password, and the RADIUS server 34, is updated with the appropriate user information and the selected user name and password for wireless access. This is all saved on the PC for future use. Finally, in step 15, the registration Internet session is then terminated.

The user is now registered with the Access Operator, assuming credit checks have been

25   successful, and normal internet wireless access can be requested with a new session.

In the case of the present invention, the new customer's User Equipment (UE) sends identifying information which is a 'new user' ID and 'new user' password when

requesting connection to the wireless access network. This is gained in a special anonymous connection. And, as discussed above, through protocol filters, the connection for registration can be suitably restricted.

Thus, customers may purchase their user equipment from a retail outlet. They will then connect their equipment to their personal computer and be able to use it to gain Internet access for the purpose of registering themselves and creating their account on-line. This user initiated registration is made possible by the use of the above-described wireless web-based Internet registration process.